

AD-A087 295

JOHNS-MANVILLE SALES CORP DENVER CO RESEARCH AND DEV--ETC F/G 13/1  
HEAT RECLAMATION FROM FLIGHT SIMULATORS.(U)  
JUN 80 P B SHEPHERD

UNCLASSIFIED

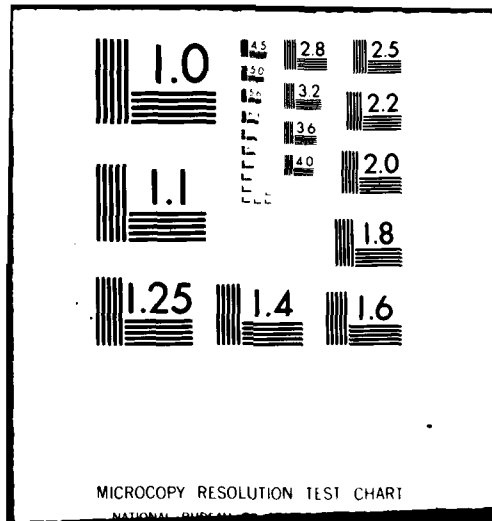
USAFESA-TS-2083

NL

1 x 1  
A/A  
1/1/78



END  
DATE  
FILMED  
9-80  
DTIC



54  
**LEVEL II**

REPORT FESA-TS 2083

(12)

**ADA 087295**

HEAT RECLAMATION FROM FLIGHT SIMULATORS

P. B. SHEPHERD  
JOHNS-MANVILLE SALES CORPORATION  
RESEARCH & DEVELOPMENT CENTER  
KEN-CARYL RANCH, DENVER, COLORADO 80217

**DTIC**  
**SELECTED**  
**S** JUL 30 1980  
**E**

FINAL REPORT FOR PERIOD 1 SEPTEMBER 1978 - 1 MARCH 1980

APPROVED FOR PUBLIC RELEASE/DISTRIBUTION UNLIMITED

**DDC FILE COPY**

PREPARED FOR:

US ARMY FACILITIES ENGINEERING SUPPORT AGENCY  
TECHNOLOGY SUPPORT DIVISION  
FORT BELVOIR, VIRGINIA 22060

**80 7 28 102**

HEAT RECLAMATION FROM  
FLIGHT SIMULATORS  
FINAL REPORT

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DDC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Supply Codes	
Dist	Avail and/or special
A	

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER FFSA-73-2083	2. GOVT ACCESSION NO. AD-A097 295	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Heat Reclamation from Flight Simulators.		5. TYPE OF REPORT & PERIOD COVERED Final - 1 Sep 78 - 1 Mar 80
7. AUTHOR(s) P. B. SHEPHERD		6. PERFORMING ORG. REPORT NUMBER
8. PERFORMING ORGANIZATION NAME AND ADDRESS Johns-Manville Corporation Research & Development Center Ken-Caryl Ranch, Denver CO 80217		9. CONTRACT OR GRANT NUMBER(s) Final rept. 1 Sep 78 - 1 Mar 80
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Facilities Engineering Support Agency Technology Support Division Fort Belvoir, VA 2206		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 12 171
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 18 USAFESA 19 FTS-2083		12. REPORT DATE 13 Jun 1980
		13. NUMBER OF PAGES 3
		15. SECURITY CLASS. (of this report) Unclassified
16. DISTRIBUTION STATEMENT (of this Report) APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Heat Reclamation; flight simulators		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A survey of selected Army flight simulator facilities was performed to determine the applicability of heat recovery devices to the associated air conditioning equipment. It was concluded that there is little potential for heat recovery at nearly all of the facilities because the refrigerant used (R-22) and the operating characteristics of the chillers produce compressor discharge temperatures too low to be suitable for any purposes other than chilled air reheat for humidity control.		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

409601

JCE

## SUMMARY

This report consists of Summary only.

The objective of Task Order No. 9 was to conduct a market and literature survey to determine the current state-of-the-art on heat reclamation devices for air conditioners used with flight simulators. Applicability of such devices to each flight simulator facility will be evaluated and will include energy savings, cost effectiveness, operation, maintenance, safety, code compliance and product warranty limitation considerations.

The US Army operates helicopter flight training simulators at the following facilities:

- Fort Sill, Oklahoma
- Fort Riley, Kansas
- Fort Hood, Texas
- Fort Rucker, Alabama
- Fort Ord, California
- Fort Bragg, North Carolina
- Fort Campbell, Kentucky
- Fort Carson, Colorado

A flight training building is being constructed at Fort Stewart, Georgia. All but one of the flight training facilities are instrument flight trainers. The facilities at Fort Rucker, Alabama, consist of both instrument and visual flight simulators. One building houses the instrument units and a second building houses the visual training units. Energy use at some flight training facilities was viewed as being very high (26,000 kwh per day) and the air conditioning requirements were consequently suspected of being extreme.

An inspection was made of the Fort Rucker facilities and a telephone survey was made of the remaining facilities. A table summarizing the surveys is appended to this Summary. In addition, the flight training facilities of United Airlines were inspected with a consultant, Dr. E. D. Sloan of the Colorado School of Mines, who co-authored the Task Order No. 2 report on heat recovery devices for air conditioners.

It was concluded that there is little potential for heat recovery at nearly all of the facilities because the refrigerant used (R-22) and operating characteristics of the chillers produce compressor discharge temperatures ranging from 90°F to 120°F. This low temperature range is potentially suitable only for chilled air reheat if required for humidity control. Only Fort Riley and Fort Rucker, Building 5102, indicated a requirement for air reheat to control humidity. All facilities excepting Fort Rucker had relatively small chillers ranging from a 7-1/2 ton unit at Fort Campbell to 60 tons at Fort Riley. Fort Rucker had two units of 160 tons and two of 180 tons. Air conditioning loads did not seem to be unusually high for flight training facilities with the special air requirements of their computer facilities.

Building 5102 at Fort Rucker did have a seemingly high consumption of electricity of 26,600 kwh per day. This, however, was the only visual flight training facility and 14,400 kwh per day was the rating of large lamp arrays required to illuminate visual terrain boards. Conversion of the cockpit imaging sources to a tabletop computer system such as Redifon's Nova Vue would eliminate the 14,400 kw lighting requirement as well as possibly reducing air cooling and humidity control requirements.

Building 5102, the visual flight training facility, also contained three cockpit chillers. These were rather conventional window air conditioning units used to maintain comfort level within the training cockpit of flight simulators. Each 3 ton unit was a York PF 24-60 with a reciprocating compressor. The three cockpit chillers might be used to provide tepid water for lavatory use. However, hours per day operation of the units is unknown because the building had not been placed in full use. Also, York does not offer heat recovery retrofit units for their air conditioners.

It is recommended that each facility requiring chilled air reheat for humidity control consult the local service office of the chiller manufacturer for a survey. For example, the Trane Company who manufactured the Fort Rucker chillers sells retrofit heat exchangers for heat reclamation to be used for air reheat. They indicated a willingness to provide a survey of the facility and recommend a course of action based on current technology.

TABLE 1

## SUMMARY OF FLIGHT SIMULATOR BUILDING COOLING SURVEY

Facility	No. of Buildings	No. of Instru-ment Units	No. of Visual Units	----Chiller/Air Conditioner-----			Discharge Pressure psig	Discharge Temp °F
				Make	Model	Capacity Refrig-erant		
Fort Rucker	2	Many	Many	Trane	ICC1744(2) LCC	180/113 160/?	-9 Not Running	97 Not Running
Fort Campbell	1	6 or 8	-	Trane	?	15T/22 7-1/2T/22		(1) (1)
Fort Hood	1	4	-	Carrier	306A055610	55T/22	190	90
Fort Carson	1	1	-	Trane	CG15B	12-1/2T/12	120-260	126-158
Fort Bragg	1	4	-	York	LCH85546A	-/22	250 Peak	117 Max.
Fort Sill	1	4	0		CA2C050 CA2C520	35T/22 10T/22	200 200	102 102
Fort Riley	1	?	0	Chrysler	8AW60-1	60T/22	225	Reported as 145°F-150°F but R-22 at 225 psig is 110°F
				Adpac	CVXC-12	10T/22	225	
Fort Stewart	Under Construction							
Fort Ord	No Communication							

(1) Data not available for these units, but R-22 is a rather low temperature refrigerant with, for example, a temperature at only 83°F at a discharge pressure of 150 psig.



# DISTRIBUTION LIST

US Military Academy  
ATTN: Dept of Mechanics  
West Point, NY 10996

US Military Academy  
ATTN: Library  
West Point, NY 10996

HQDA (DALO-TSE-F)  
WASH DC 20314

HQDA (DAEN-ASI-L) (2)  
WASH DC 20314

HQDA (DAEN-MPO-B)  
WASH DC 20314

HQDA (DAEN-MPR-A)  
WASH DC 20314

HQDA (DAEN-MPO-U)  
WASH DC 20314

HQDA (DAEN-MPZ-A)  
WASH DC 20314

HQDA (DAEN-MPZ-E)  
WASH DC 20314

HQDA (DAEN-MPZ-G)  
WASH DC 20314

HQDA (DAEM-RDM)  
WASH DC 20314

HQDA (DAEN-RDL)  
WASH DC 20314

Director, USA-WES  
ATTN: Library  
PO Box 631  
Vicksburg, MS 39181

Commander, TRADOC  
Office of the Engineer  
ATTN: ATEN  
Ft Monroe, VA 23651

Commander, TRADOC  
Office of the Engineer  
ATTN: ATEN-FE-U  
Ft Monroe, VA 23651

AF Civil Engr Center/XRL  
Tyndall AFB, FL 32401

Naval Facilities Engr Command  
ATTN: Code 04  
200 Stovall St.  
Alexandria, VA 22332

Defense Documentation Center  
ATTN: TCA (12)  
Cameron Station  
Alexandria, VA 22314

Commander and Director  
USA Cold Regions Research Engineering  
Laboratory  
Hanover, NH 03755

FORSCOM  
ATTN: AFEN  
Ft McPherson, GA 30330

FORSCOM  
ATTN: AFEN-FE  
Ft McPherson, GA 30330

Officer-in-Charge  
Civil Engineering Laboratory  
Naval Construction Battalion Center  
ATTN: Library (Code L08A)  
Port Hueneme, CA 93043

Commander and Director  
USA Construction Engineering  
Research Laboratory  
PO Box 4005  
Champaign, IL 61820

Commanding General, 3d USA  
ATTN: Engineer  
Ft McPherson, GA 30330

Commanding General, 5th USA  
ATTN: Engineer  
Ft Sam Houston, TX 78234

AFCE Center  
Tyndall AFB, FL 32403

Commander, DARCOM  
Director, Installation  
and Services  
5001 Eisenhower Ave  
Alexandria, VA 22333

Commander, DARCOM  
ATTN: Chief, Engr Div  
5001 Eisenhower Ave  
Alexandria, VA 22333

Air Force Weapons Lab/AFML/DE  
Chief, Civil Engineering  
Research Division  
Kirtland AFB, NM 87117

Strategic Air Command  
ATTN: DSC/CE (DEEE)  
Offutt AFB, NE 68112

Headquarters USAF  
Directorate of Civil Engineering  
AF/PREES  
Bolling AFB  
Washington, DC 20333

Strategic Air Command  
Engineering  
ATTN: Ed Morgan  
Offutt AFB, NE 68113

USAF Institute of Technology  
AFIT/DED  
Wright Patterson AFB, OH 45433

Air Force Weapons Lab  
Technical Library (DOUL)  
Kirtland AFB, FL 87117

Chief, Naval Facilities  
Engineer Command  
ATTN: Chief Engineer  
Department of the Navy  
Washington, DC 20350

Commander  
Naval Facilities Engineering Cmd  
200 Stovall St  
Alexandria, VA 22332

Commander  
Naval Facilities Engr Cmd  
Western Division  
Box 727  
San Bruno, CA 94066

Civil Engineering Center  
ATTN: Moreell Library  
Port Hueneme, CA 93043

Commandant of the Marine Corps  
HQ, US Marine Corps  
Washington, DC 20380

National Bureau of Standards (4)  
Materials & Composites Section  
Center for Building Technology  
Washington, DC 20234

Assistant Chief of Engineers  
Room 1E 668, Pentagon  
Washington, DC 20310

The Army Library (ANRAL-R)  
ATTN: Army Studies Section  
Room 1A 518, The Pentagon  
Washington, DC 20310

Commander-in Chief  
USA, Europe  
ATTN: AEAEN  
APO New York, NY 09403

Commander  
USA Foreign Science and  
Technology Center  
220 8th St. N.E.  
Charlottesville, VA 22901

Commander  
USA Science & Technology  
Information Team, Europe  
APO New York 09710

Commander  
USA Science & Technology  
Center - Far East Office  
APO San Francisco 96328

Commanding General  
US Engineer Command, Europe  
APO New York 09403

Deputy Chief of Staff  
for Logistics  
US Army, The Pentagon  
Washington, DC 20310

Commander, TRADOC  
Office of the Engineer  
ATTN: Chief, Facilities  
Engineering Division  
Ft Monroe, VA 23651

Commanding General  
USA Forces Command  
Office of the Engineer  
(AFEN-FES)  
Ft McPherson, GA 30330

Commanding General  
USA Forces Command  
ATTN: Chief, Facilities  
Engineering Division  
Ft McPherson, GA 30330

Commanding General, 1st USA  
ATTN: Engineer  
Ft George G. Meade, MD 20755

Commander  
USA Support Command, Hawaii  
Fort Shafter, HI 96858

Commander  
Eighth US Army  
APO San Francisco 96301

Commander  
US Army Facility Engineer  
Activity - Korea  
APO San Francisco 96301

Commander  
US Army, Japan  
APO San Francisco 96343

Facilities Engineer  
Fort Belvoir  
Fort Belvoir, VA 22060

Facilities Engineer  
Fort Benning  
Fort Benning, GA 31905

Facilities Engineer  
Fort Bliss  
Fort Bliss, TX 79916

Facilities Engineer  
Carlisle Barracks  
Carlisle Barracks, PA 17013

Facilities Engineer  
Fort Chaffee  
Fort Chaffee, AR 72902

Facilities Engineer  
Fort Dix  
Fort Dix, NY 08640

Facilities Engineer  
Fort Eustis  
Fort Eustis, VA 23604

Facilities Engineer  
Fort Gordon  
Fort Gordon, GA 30905

Facilities Engineer  
Fort Hamilton  
Fort Hamilton, NY 11252

Facilities Engineer  
Fort A P Hill  
Bowling Green, VA 22427

Facilities Engineer  
Fort Jackson  
Fort Jackson, SC 29207

Facilities Engineer  
Fort Knox  
Fort Knox, KY 40121

Facilities Engineer  
Fort Lee  
Fort Lee, VA 23801

Facilities Engineer  
Fort McClellan  
Fort McClellan, AL 36201

Facilities Engineer  
Fort Monroe  
Fort Monroe, VA 23651

Facilities Engineer  
Presidio of Monterey  
Presidio of Monterey, CA 93940

Facilities Engineer  
Fort Pickett  
Blackstone, VA 23824

Facilities Engineer  
Fort Rucker  
Fort Rucker, AL 36362

Facilities Engineer  
Fort Sill  
Fort Sill, OK 73503

Facilities Engineer  
Fort Story  
Fort Story, VA 23459

Facilities Engineer  
Kansas Army Ammunition Plant  
Independence, MO 64056

Facilities Engineer  
Lone Star Army Ammunition Plant  
Texarkana, TX 75501

Facilities Engineer  
Picatinny Arsenal  
Dover, NJ 07801

Facilities Engineer  
Louisiana Army Ammunition Plant  
Shreveport, LA 71130

Facilities Engineer  
Milan Army Ammunition Plant  
Warren, MI 48089

Facilities Engineer  
Pine Bluff Arsenal  
Pine Bluff, AR 71601

Facilities Engineer  
Radford Army Ammunition Plant  
Radford, VA 24141

Facilities Engineer  
Rock Island Arsenal  
Rock Island, IL 61201

Facilities Engineer  
Rocky Mountain Arsenal  
Dever, CO 80340

Facilities Engineer  
Scranton Army Ammunition Plant  
156 Cedar Avenue  
Scranton, PA 18503

Facilities Engineer  
Tobyhanna Army Depot  
Tobyhanna, PA 18466

Facilities Engineer  
Tooele Army Depot  
Tooele, UT 84074

Facilities Engineer  
Arlington Hall Station  
400 Arlington Blvd  
Arlington, VA 22212

Facilities Engineer  
Cameron Station, Bldg 17  
5010 Duke Street  
Alexandria, VA 22314

Facilities Engineer  
Sunny Point Military  
Ocean Terminal  
Southport, NC 28461

Facilities Engineer  
US Military Academy  
West Point Reservation  
West Point, NY 10996

Facilities Engineer  
Fort Ritchie  
Fort Ritchie, MD 21719

Facilities Engineer  
Army Materials & Mechanics  
Research Center  
Watertown, MA 02172

Facilities Engineer  
Ballistics Missile Advanced  
Technology Center  
PO Box 1500  
Huntsville, AL 35807

Facilities Engineer  
Fort Wainwright  
172d Infantry Brigade  
Fort Wainwright, AK 99703

Facilities Engineer  
Fort Greely  
172d Infantry Brigade  
Fort Richardson, AK 99505

Facilities Engineer  
Tarheel Army Missile Plant  
204 Granham-Hopedale Rd  
Burlington, NC 27215

Facilities Engineer  
Harry Diamond Laboratories  
2800 Powder Mill Rd  
Adelphi, MD 20783

Facilities Engineer  
Fort Missoula  
Missoula, MT 59801

Facilities Engineer  
New Cumberland Army Depot  
New Cumberland, PA 17070

Facilities Engineer  
Oakland Army Base  
Oakland, CA 94626

Facilities Engineer  
Vint Hill Farms Station  
Warrentown, VA 22186

Facilities Engineer  
Twin Cities Army Ammunition Plant  
New Brighton, MN 55112

Facilities Engineer  
Volunteer Army Ammunition Plant  
Chattanooga, TN 37401

Facilities Engineer  
Watervliet Arsenal  
Watervliet, NY 12189

Facilities Engineer  
St Louis Area Support Center  
Granite City, IL 62040

Facilities Engineer  
Fort Monmouth  
Fort Monmouth, NJ 07703

Facilities Engineer  
Redstone Arsenal  
Redstone Arsenal, AL 35809

Facilities Engineer  
Detroit Arsenal  
Warren, MI 48039

Facilities Engineer  
Aberdeen Proving Ground  
Aberdeen Proving Ground, MD 21005

Facilities Engineer  
Jefferson Proving Ground  
Madison, IN 47250

Facilities Engineer  
Dugway Proving Ground  
Dugway, UT 84022

Facilities Engineer  
Fort McCoy  
Sparta, WI 54656

Facilities Engineer  
White Sands Missile Range  
White Sands Missile Range, NM 88002

Facilities Engineer  
Yuma Proving Ground  
Yuma, AZ 85364

Facilities Engineer  
Natick Research & Dev Ctr  
Kansas St.  
Natick, MA 01760

Facilities Engineer  
Fort Bragg  
Fort Bragg, NC 28307

Facilities Engineer  
Fort Campbell  
Fort Campbell, KY 42223

Facilities Engineer  
Fort Carson  
Fort Carson, CO 80913

Facilities Engineer  
Fort Drum  
Watertown, NY 13601

Facilities Engineer  
Fort Hood  
Fort Hood, TX 76544

Facilities Engineer  
Fort Indiantown Gap  
Annville, PA 17003

Facilities Engineer  
Fort Lewis  
Fort Lewis, WA 98433

Facilities Engineer  
Fort MacArthur  
Fort MacArthur, CA 90731

Facilities Engineer  
Fort McPherson  
Fort McPherson, GA 30330

Facilities Engineer  
Fort George G. Meade  
Fort George G. Meade, MD 20755

Facilities Engineer  
Fort Polk  
Fort Polk, LA 71459

Facilities Engineer  
Fort Riley  
Fort Riley, KS 66442

Facilities Engineer  
Fort Stewart  
Fort Stewart, GA 31312

Facilities Engineer  
Indiana Army Ammunition Plant  
Charlestown, IN 47111

Facilities Engineer  
Joliet Army Ammunition Plant  
Joliet, IL 60436

Facilities Engineer  
Anniston Army Depot  
Anniston, AL 36201

Facilities Engineer  
Corpus Christi Army Depot  
Corpus Christi, TX 78419

Facilities Engineer  
Red River Army Depot  
Texarkana, TX 75501

Facilities Engineer  
Sacramento Army Depot  
Sacramento, CA 95813

Facilities Engineer  
Sharpe Army Depot  
Lathrope, CA 95330

Facilities Engineer  
Seneca Army Depot  
Romulus, NY 14541

Facilities Engineer  
Fort Ord  
Fort Ord, CA 93941

Facilities Engineer  
Presidio of San Francisco  
Presidio of San Francisco, CA 94129

Facilities Engineer  
Fort Sheridan  
Fort Sheridan, IL 60037

Facilities Engineer  
Holston Army Ammunition Plant  
Kingsport, TN 37662

Facilities Engineer  
Baltimore Outport  
Baltimore, MD 21222

Facilities Engineer  
Bayonne Military Ocean Terminal  
Bayonne, NJ 07002

Facilities Engineer  
Bay Area Military Ocean Terminal  
Oakland, CA 94626

Facilities Engineer  
Gulf Outport  
New Orleans, LA 70146

Facilities Engineer  
Fort Huachuca  
Fort Huachuca, AZ 86513

Facilities Engineer  
Letterkenny Army Depot  
Chambersburg, PA 17201

Facilities Engineer  
Michigan Army Missile Plant  
Warren, MI 48089

COL E. C. Lussier  
Fitzsimons Army Med Center  
ATTN: HSF-DFE  
Denver, CO 80240

US Army Engr Dist, New York  
ATTN: NANEN-E  
26 Federal Plaza  
New York, NY 10007

USA Engr Dist, Baltimore  
ATTN: Chief, Engr Div  
PO Box 1715  
Baltimore, MD 21203

USA Engr Dist, Charleston  
ATTN: Chief, Engr Div  
PO Box 919  
Charleston, SC 29402

USA Engr Dist, Detroit  
PO Box 1027  
Detroit, MI 48231

USA Engr Dist, Kansas City  
ATTN: Chief, Engr Div  
700 Federal Office Bldg  
601 E 12th St  
Kansas City, MO 64106

USA Engr Dist, Omaha  
ATTN: Chief, Engr Div  
7410 USOP and Courthouse  
215 N. 17th St  
Omaha, NE 68102

USA Engr Dist, Fort Worth  
ATTN: Chief, SWFED-D  
PO Box 17300  
Fort Worth, TX 76102

USA Engr Dist, Sacramento  
ATTN: Chief, SPKED-D  
650 Capitol Mall  
Sacramento, CA 95814

USA Engr Dist, Far East  
ATTN: Chief, Engr Div  
APO San Francisco, CA 96301

USA Engr Dist, Japan  
APO San Francisco, CA 96343

USA Engr Div, Europe  
European Div, Corps of Engineers  
APO New York, NY 09757

USA Engr Div, North Atlantic  
ATTN: Chief, NADEN-T  
90 Church St  
New York, NY 10007

USA Engr Div, South Atlantic  
ATTN: Chief, SAEN-TE  
510 Title Bldg  
30 Pryor St, SW  
Atlanta, GA 30303

USA Engr Dist, Mobile  
ATTN: Chief, SAMEN-C  
PO Box 2288  
Mobile, AL 36601

USA Engr Dist, Louisville  
ATTN: Chief, Engr Div  
PO Box 59  
Louisville, KY 40201

USA Engr Div, Norfolk  
ATTN: Chief, NAOEN-D  
803 Front Street  
Norfolk, VA 23510

USA Engr Div, Missouri River  
ATTN: Chief, Engr Div  
PO Box 103 Downtown Station  
Omaha, NE 68101

USA Engr Div, South Pacific  
ATTN: Chief, SPDED-TG  
630 Sansome St, Rm 1216  
San Francisco, CA 94111

USA Engr Div, Huntsville  
ATTN: Chief, HNEDE-ME  
PO Box 1600 West Station  
Huntsville, AL 35807

USA Engr Div, Ohio River  
ATTN: Chief, Engr Div  
PO Box 1159  
Cincinnati, OH 45201

USA Engr Div, North Central  
ATTN: Chief, Engr Div  
536 S. Clark St.  
Chicago, IL 60605

USA Engr Div, Southwestern  
ATTN: Chief, SWDED-TM  
Main Tower Bldg, 1200 Main St  
Dallas, TX 75202

USA Engr Dist, Savannah  
ATTN: Chief, SASAS-L  
PO Box 889  
Savannah, GA 31402

Commander  
US Army Facilities Engineering  
Support Agency  
Support Detachment II  
Fort Gillem, GA 30050



Commander  
US Army Facilities Engr Spt Agency  
ATTN: MAJ Brisbane  
Support Detachment III  
PO Box 6550  
Fort Bliss, TX 70015

NCOIC  
US Army Facilities Engr Spt Agency  
Support Detachment III  
ATTN: FESA-III-SI  
PO Box 3031  
Fort Sill, OK 73503

NCOIC  
US Army Facilities Engr Spt Agency  
Support Detachment III  
ATTN: FESA-III-PR  
PO Box 29704  
Presidio of San Francisco, CA 94129

NCOIC  
US Army Facilities Engr Spt Agency  
ATTN: FESA-III-CA  
Post Locator  
Fort Carson, CO 80913

Commander/CPT Ryan  
US Army Facilities Engr Spt Agency  
Support Detachment IV  
PO Box 300  
Fort Monmouth, NJ 07703

NCOIC  
US Army Facilities Engr Spt Agency  
ATTN: FESA-IV-MU  
PO Box 300  
Fort Monmouth, NJ 07703

NCOIC  
US Army Facilities Engr Spt Agency  
Support Detachment IV  
ATTN: FESA-IV-ST  
Stewart Army Subpost  
Newburgh, NY 12250

NCOIC  
US Army Facilities Engineering  
Support Agency  
Support Detachment II  
ATTN: FESA-II-JA  
Fort Jackson, SC 29207

NCOIC  
US Army Facilities Engr Spt Agency  
Support Detachment II  
PO Box 2207  
Fort Benning, GA 31905

NCOIC  
US Army Facilities Engr Spt Agency  
Support Detachment II  
ATTN: FESA-II-KN  
Fort Knox, KY 40121

Naval Facilities Engineering Cmd  
Energy Programs Branch, Code 1023  
Hoffman Bldg 2, (Mr. John Hughes)  
Stovall Street  
Alexandria, VA 22332

US Army Facilities Engineering  
Support Agency  
FE Support Detachment I  
APO New York 09081

Navy Energy Office  
ATTN: W. R. Mitchum  
Washington, DC 20350

Mr. David C. Hall  
Energy Projects Officer  
Dept of the Air Force  
Sacramento Air Logistics  
Center (AFLEC)  
2852 ABG/DEE  
Ft McClellan, CA 95652

USA Engineer District, Chicago  
219 S. Dearborn Street  
ATTN: District Engineer  
Chicago, IL 60604

Directorate of Facilities Engineer  
Energy Environmental and  
Self Help Center  
Fort Campbell, KY 42223

Commander and Director  
Construction Engineering  
Research Laboratory  
ATTN: COL Circeo  
PO Box 4005  
Champaign, IL 61820

Mr. Ray Heller  
Engineering Services Branch  
DFAE, Bldg 1950  
Fort Sill, OK 73503

HQ, US Military Community Activity,  
Heilbronn  
Director of Engineering & Housing  
ATTN: Mr. Rodger D. Romans  
APO New York 09176

Commanding General  
HQ USATC and Fort Leonard Wood  
ATTN: Facility Engineer  
Fort Leonard Wood, MO 65473

NCOIC  
535th Engineer Detachment, Team A  
ATTN: SFC Prenger  
PO Box 224  
Fort Knox, KY 40121

NCOIC  
535th Engineer Detachment, Team B  
ATTN: SP6 Cathers  
PO Box 300  
Fort Monmouth, NJ 07703

NCOIC  
535th Engineer Detachment, Team C  
ATTN: SFC Jackson  
PO Box 4301  
Fort Eustis, VA 23604

NCOIC  
535th Engineer Detachment, Team D  
ATTN: SFC Hughes  
Stewart Army Subpost  
Newburg, NY 12550

Commander-in-Chief  
HQ, USAREUR  
ATTN: AEAEN-EH-U  
APO New York 09403

HQ AFESC/RDVA  
Mr. Hathaway  
Tyndall AFB, FL 32403

Commander and Director  
Construction Engineering Research  
Laboratory  
ATTN: Library  
PO Box 4005  
Champaign, IL 61820

HQ, 5th Signal Command  
Office of the Engineer  
APO New York 09056

SSG Ruiz Burgos Andres  
D.F.E., HHC HQ Cmd 193d Inf  
BDE  
Ft Clayton, C/Z

Energy//Environmental Office  
ATTN: Mr. David P. Nichols  
USMCA-NBG (DEH)  
APO New York 09696

Commander  
535th Engineer Detachment  
PO Box 300  
Fort Monmouth, NJ 07703

Commander  
Presidio of San Francisco,  
California  
ATTN: AFZM-DI/Mr. Prugh  
San Francisco, CA 94129

Facilities Engineer  
Corpus Christi Army Depot  
ATTN: Mr. Joseph Canpu/Stop 24  
Corpus Christi, TX 78419

Walter Reed Army Medical Center  
ATTN: HSWS-E/Mr. James Prince  
6825 16th St., NW  
Washington, DC 20012

Commanding Officer  
Installations and Services Activity  
ATTN: DRCIS-RI-IB  
Rock Island Arsenal  
Rock Island, IL 61299

Commanding Officer  
Northern Division Naval  
Facilities Engineering Command  
Code 102 (Mr. E.F. HUMM)  
Naval Base  
Philadelphia, PA 19112

Commander US Army Facilities Engineering  
Support Agency  
Support Detachment I  
APO New York 09081

HQ, USA Health Services Cnd  
Bldg 2792  
ATTN: HSLO-F  
Fort Sam Houston, TX 78234

HQDA  
(DAEN-MPE-E)  
WASH DC 20314

Commanding Officer  
Northern Division Naval  
Facilities Engineering Command  
Code 10  
Naval Base, Building 77  
Philadelphia, PA 19112

Facilities Engineer  
Fort Leavenworth  
Fort Leavenworth, KS 66027

Facilities Engineer  
Fort Benjamin Harrison  
Fort Benjamin Harrison, IN 46216

Office of the A&E  
ATTN: MAJ Johnson  
Camp Ripley  
Little Falls, MN 56345

Commander  
US Army Garrison  
ATTN: HSD-FE  
Fort Detrick, MD 21701

AFESC/DEB  
ATTN: Mr. Fred Beason  
Tyndall AFB, FL 32403

Mr. David White  
Defense Audit Service  
888 North Sepulveda Blvd.  
Suite 610  
El Segundo, CA 90245

Facilities Engineer  
Bldg. 308  
Fort Myer, VA 22211

NAVFAC  
ATTN: John Zekan  
Code 0833  
Hoffmann Building  
200 Stovall Street  
Alexandria, VA 22332

**DAT  
FILM**